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(54) Heavy duty fragmenting device, in particular fragmenting or scrap metal shear

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Heavy duty fragmenting device, in particular fragmenting or
scrap metal shear

This invention relates to a heavy duty fragmenting device, in particular a fragmenting or scrap metal shear with a housing, which is attachable to a device, in particular an excavator, and which carries two jaws that can be swiveled relative to each other, wherein the 1st jaw is separable from the housing via 1st and 2nd holding devices, which are distanced from each other, and wherein a 2nd jaw is attached to the 1st jaw via a swivel bearing and is held by a drive unit which acts at a distance from the swivel bearing, such that the two jaws are detachable from the housing as a unit.

In the case of a fragmenting device as described in EP-B-0 453 773, which is usually intended as an attachment to the shaft or arm of an excavator or a similar device, the jaws are connected by means of a swivel bearing and one of the jaws can be actuated by means of a hydraulic cylinder, whereby the jaws of the fragmenting device can be opened or closed. The swivel bearing also serves the purpose of fastening both jaws to the housing of the fragmenting device.

In operating the fragmenting device, there is frequently a need to interchange the jaws, since either the knives or the cutting edges are worn or jaws suitable for breaking up other materials must be attached. In accordance with EP-B-0 453 773, the swivel bearing must to be separated from the housing for this purpose, requiring both jaws to be indi-

vidually disassembled from the housing, which is however very labor-intensive and time-consuming. The constant assembly and disassembly of the swivel bearing is additionally damaging to the bearing properties.

A similar fragmenting device in which the swivel bearing has a special pin design, which makes it possible to loosen the mounting of the swivel bearing to the housing without separating the two jaws from each other, so that the jaws can be removed from the housing as a connected unit, is known from EP-A-0 641 618, based on the introductory clause of claim 1. As a result, however, the swivel bearing is very complex with regard to its design and, in particular, has the disadvantage that, because of its double function as a swivel bearing and as a fixture that can be loosened from the jaws, the design of the pin is highly limited in its possible configurations, so that an optimum design regarding both desired functions cannot be attained or can only be attained with difficulty.

This invention is based on the task of providing a fragmenting device of the aforesaid kind, in which the aforesaid disadvantages are avoided and in which the jaws are readily interchangeable as a unit.

This task is accomplished according to this invention by means of a fragmenting device of the aforesaid kind in that 1st and the 2nd holding devices are configured independently of the swivel bearing and in that the 1st holding device has a part that interlocks with the housing or the 1st jaw and a guide located on the other corresponding component, into which the interlocking device can be inserted so that the movement of the interlocking device in the guide can be blocked by means of a 2nd holding device.

According to this invention, a design is provided wherein the 1st jaw is attached to the housing of the fragmenting device by means of both holding devices, while the 2nd jaw is not directly mounted on the housing, but rather, on the one hand, is connected to the 1st jaw by means of the swivel bearing and, on the other hand, is held by the drive unit, which is preferably a hydraulic cylinder mounted on the housing. The swivel bearing thus serves only as a reciprocally swiveling mounting of the two jaws without attaching them to the housing so that it can constructively perform its intended function in an optimal manner. The swivel bearing also holds the two jaws together as a unit when

they are removed from the housing, whereby their substitution is facilitated.

To attach the jaws to the housing, it is, according to this invention, only necessary to insert the interlocking part, which is preferably a pin, into the guide and to then attach the 2nd holding device, which can be a simply designed locking pin connection known in the art. While the pin is displaceable along the guide, the use and the attachment of the 2nd holding device prevents the pin from being displaced, so that an altogether secure and simply designed mounting of the jaws to the housing is achieved.

To remove the jaws from the housing, the design of this invention requires only the 2nd holding device of the 1st jaw as well as the fastening between that 2nd jaw and the drive unit to be loosened, while the two jaws remain connected via the swivel bearing. On removal of the jaws from the housing, the pin slides out of the guide without further connections having to be undone.

It has been shown to be advantageous, from a design standpoint, to form the guide from two spatially separated, parallel grooves, which are aligned with each other so that the pin fits into one of the grooves with its two axial end sections. It is thus also possible to safely absorb and transmit bending moments via the connection.

To prevent any movement of the first jaws relative to the housing in the axial direction of the pin, a further embodiment of this invention specifies that the grooves are to be closed on three sides and should face each other with their open sides. Furthermore, the pin should be capable of being inserted into the grooves with a close fit, which can be operationally facilitated by means of a corresponding conical configuration of the cross section of the opening.

Secure bracing of the pin in the grooves is achieved, if, in its blocked condition within the grooves, the pin rests against the end of the grooves. The pin is thus supported by the side walls and the end wall of the grooves over a relatively large periphery and it can only be shifted in one direction, which can however be prevented by the 2nd holding device.

In a possible embodiment of this invention, the grooves are located on the 1st jaw and the pins on the housing, but a

corresponding reverse placement of grooves and the pin is also possible.

Further details and features of this invention are shown by the following description of an exemplary embodiment with reference to the drawings. The drawings show:

- Figure 1 a side view of the fragmenting device with the jaws removed,
- Figure 2 a partially crosscut front view of the fragmenting device in accordance with Figure 1 and
- Figure 3 the fragmenting device in accordance with Figure 1 with the jaws attached.

In accordance with the figures, a fragmenting or scrap metal shear 10 comprises a housing 11, whose upper part can be connected via a connecting head 12 to the handle of an excavator or another device, which is not represented, in a manner such that the shear 10 can be rotated around an axis A as indicated by the double arrow D.

A 1st jaw 13 is attachable to the housing 11 via two holding devices 19 and 20 that are spatially separated from each other, one of which is a 1st holding device 19 configured as a pin-groove connection and the other a 2nd holding device 20 configured as a locking pin connection, which is described in detail below. The 1st jaw 13 carries a 2nd jaw 14 via a swivel bearing 15, the 2nd jaw being coupled with a hydraulic cylinder 16 at a bearing 18 that is spatially separated from the swivel bearing 15. The hydraulic cylinder is in turn connected to the housing via a swivel bearing 17, so that it can swing between two essentially parallel, spatially separated side walls 11a of the housing 11. On actuating the hydraulic cylinder 16, the second jaw 14 can be swiveled about the swivel bearing 15 relative to the 1st jaw 13 as well as relative to the housing 11, whereby the shear can be opened and closed.

As Figure 2 shows, the 2nd holding device 20 comprises a tubular crossbeam 24 that is welded in between the side walls 11a of the housing 11, which crossbeam penetrates the side walls 11a and is open on the front side. The 1st jaw 13 has two mutually separated, essentially parallel side walls 13a, whose clearance approximately corresponds to the outside distance between the side walls 11a of the housing 11.

In this way the 1st jaws 13 can attach to the outside of the housing 11 and can also be brought into alignment with the tubular cross beam 24 through the holes 23 in the side walls 13a. As indicated in Figure 2, a locking pin 25 can penetrate into the holes 23 and the tubular cross beam 25 and can thus attach the 1st jaw 13 to the housing 11 by means of the 2nd holding device 20.

The 1st holding device 19 comprises a pin 21 connecting the two side walls 11a of the housing 11 and extending beyond the latter, which pin is firmly attached to the side walls 11a. A groove 22 is machined into each side wall 13a of the 1st jaw 13, with the grooves being closed on three sides and with their open sides facing each other. Each groove 22 contains an insertion section 22a, which opens toward the side lip of the 1st jaw 13 and to which a receiving section 22b is connected whose width corresponds to the diameter of the pin 21, so that the latter can be inserted into the grooves 22 with a close fit.

To mount the jaws 13 and 14 shown in the released condition in Figure 1 on the housing 11, the pin 21 is, with its axially protruding end sections 21a, first introduced into the insertion section 22a via the receiving section 22b until it rests against the end of the grooves 22. In this condition, the holes 23 of the side walls 13a of the 1st jaw 13 are accurately aligned with the tubular cross beam 24, so that the locking pin 25 forming the 2nd holding device 20 can be readily inserted. The assembly is finished by coupling a hole 14a of the 2nd jaw 14 with an eye 16a of the hydraulic cylinder 16 to form the bearing 18. The disassembly occurs in the reverse direction, such that it is only necessary to pull out the locking pin 25 to release the 1st jaw 13 from the housing 11, whereupon the pin 21 can be readily pulled out of the grooves 22.

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Claims

1. Fragmenting device for a heavy duty excavator, in particular a fragmenting or scrap metal shear, with a housing (11), which is attachable to a device, particularly an excavator, and which carries two cooperating jaws (13, 14) that can swivel relative to each other, such that a 1st jaw (13) is removably attached to the housing (11) via 1st and 2nd holding devices (19, 20), which are spatially separated from each other, and such that a 2nd jaw (14) is attached to the 1st jaw (13) by means of a swivel bearing (15) and is held by means of drive unit (16) which acts at a distance from the swivel bearing (15), with the two jaws (13, 14) being removable from the housing (11) as a unit, characterized in that the 1st and the 2nd holding devices (19, 20) are independent of the swivel bearing (15) and that the 1st holding device (19) has an interlocking part (21) associated with the housing (11) or with the 1st jaw (13) and a guide (22) that is formed in the other corresponding component (11 or 13), into which the interlocking part (21) can be inserted, wherein any movement of the interlocking part (21) in the guide (22) can be blocked by means of the 2nd holding device (20).
2. Fragmenting device according to claim 1, characterized in that the interlocking part is a pin (21).

3. Fragmenting device according to claim 1 or 2, characterized in that the guide is formed by two separate, parallel grooves (22).
4. Fragmenting device according to claim 3, characterized in that the grooves (22) are closed on three sides and face each other with their open sides.
5. Fragmenting device according to one of the claims 2 to 4, characterized in that the pin (21) can be inserted into the grooves (22) with a close fit.
6. Fragmenting device according to one of the claims 2 to 5, characterized in that, in its arrested state in the grooves (22), the pin (21) rests against the end of the grooves (22).
7. Fragmenting device according to one of the claims 1 to 6, characterized in that the grooves (22) are located on the 1st jaw (13) and the pin (21) on the housing (11).
8. Fragmenting device according to one of the claims 1 to 7, characterized in that the 2nd holding device (20) is formed by a locking pin connection (23, 24, 25).

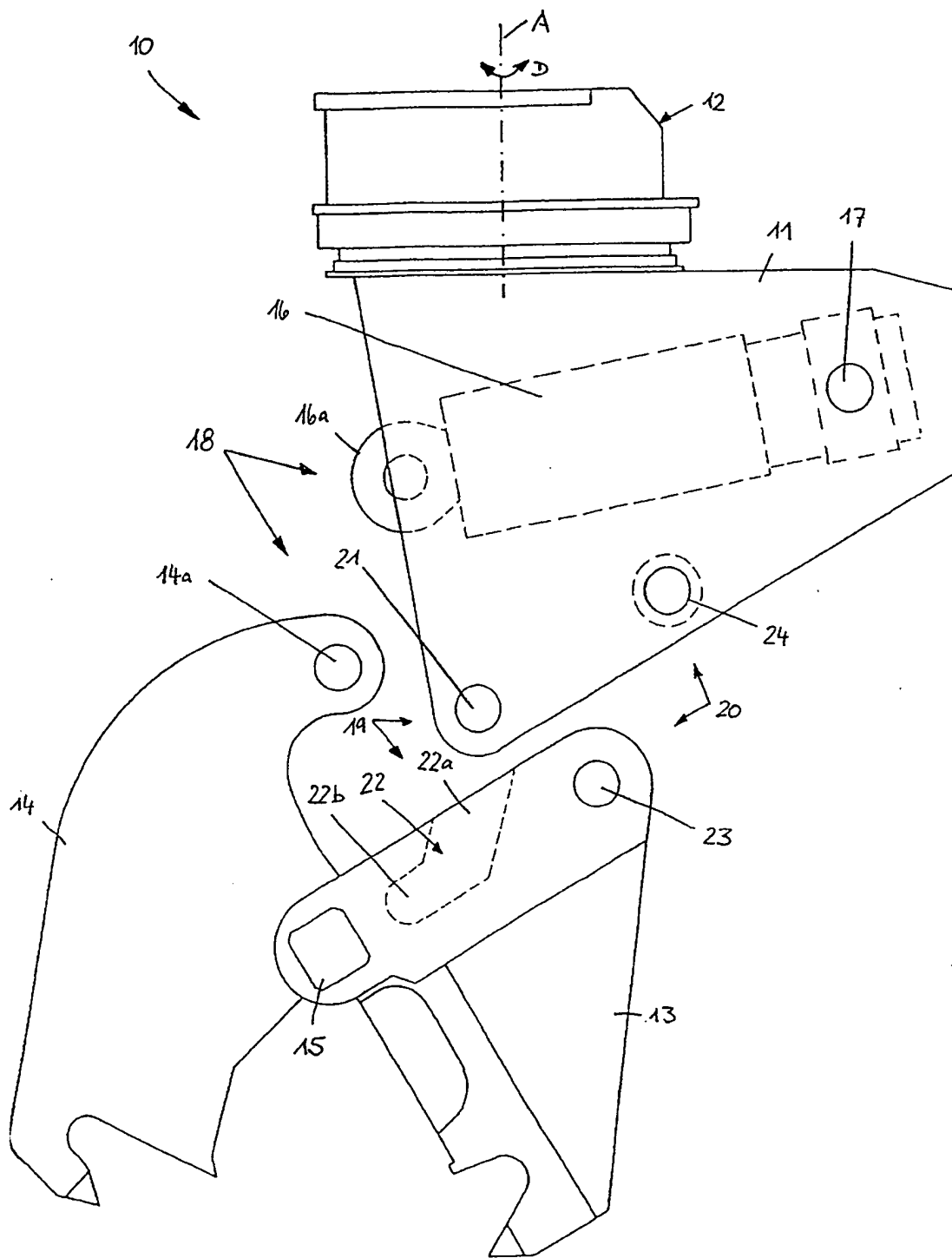


FIG. 1

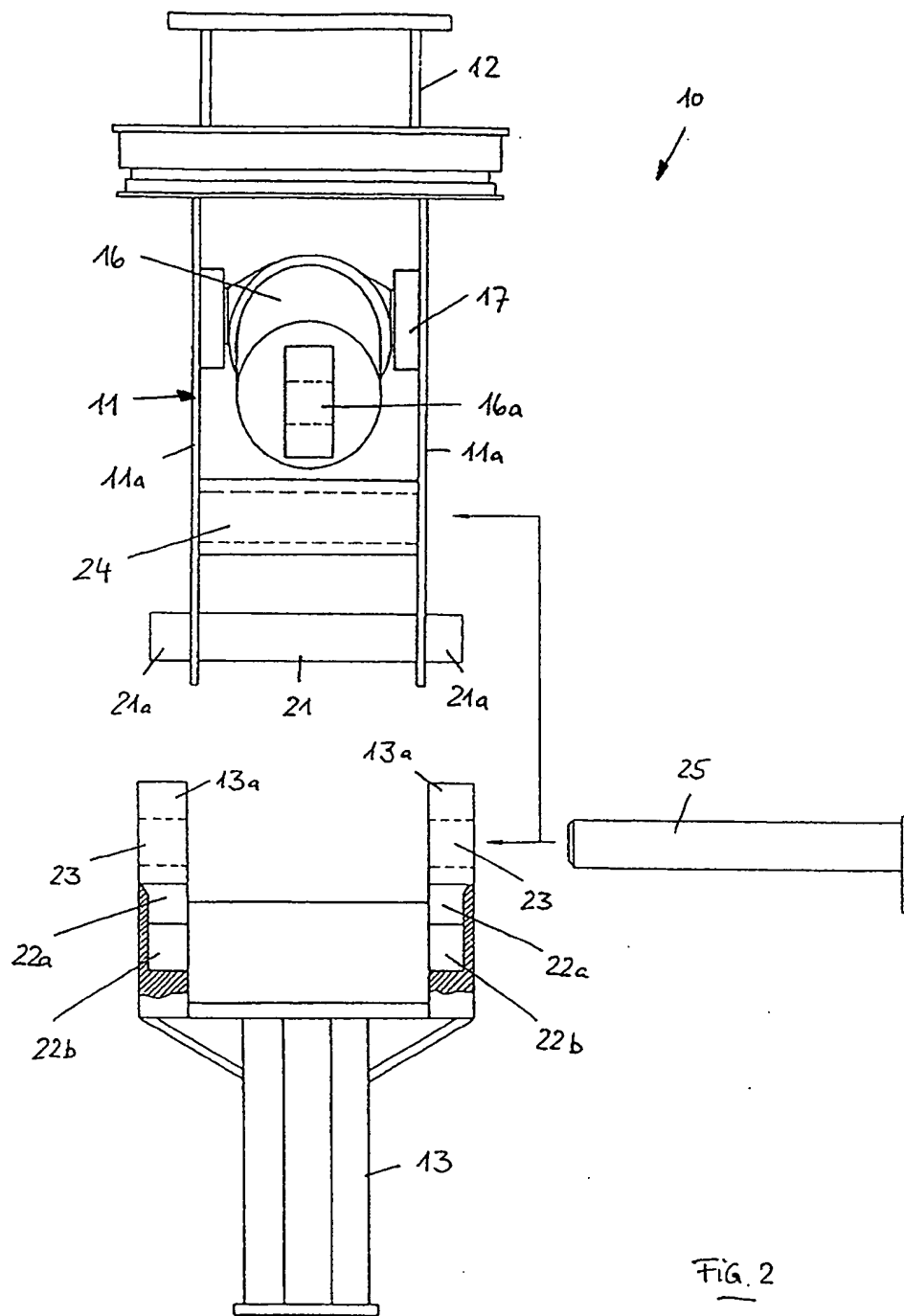


FIG. 2

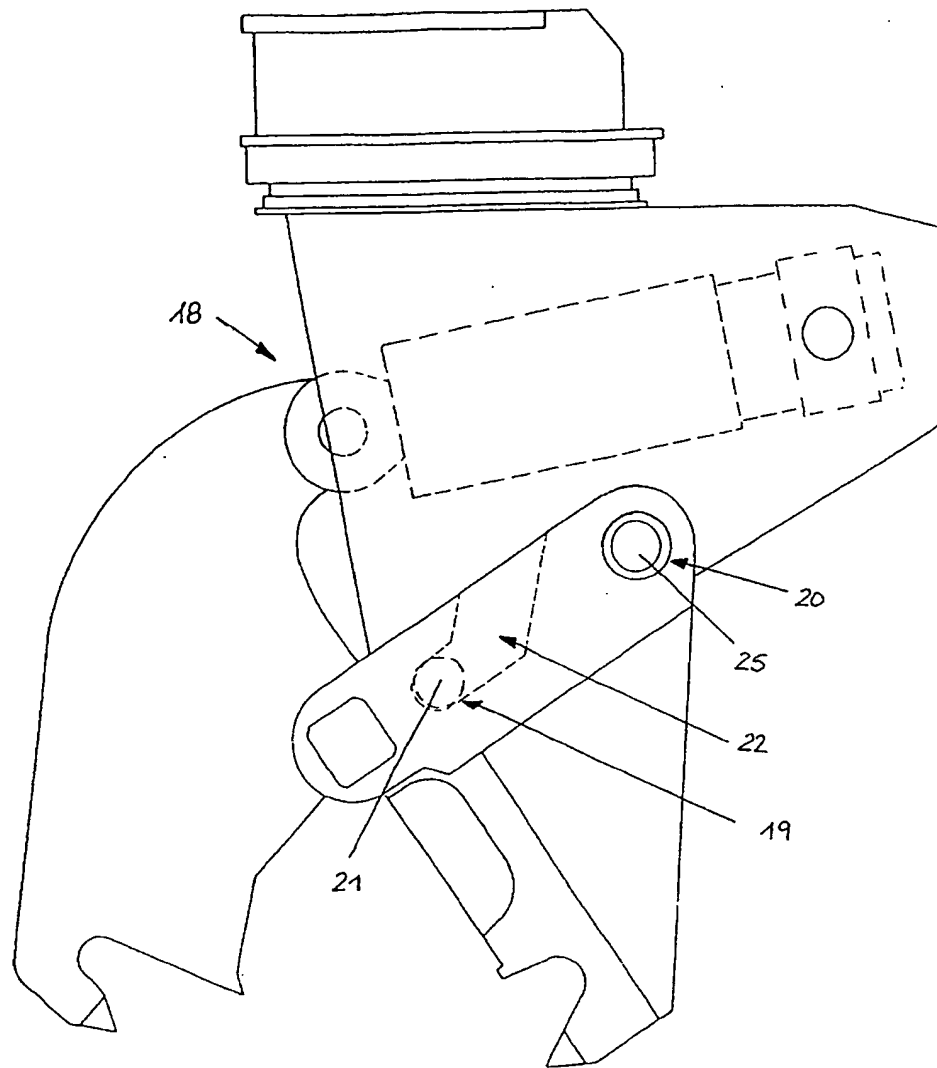


Fig. 3